

Commercial Gas Water Heater Installation Instructions and Use & Care Guide

for models with prefix DCG and ADCG

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.



To obtain technical, warranty or service assistance during or after the installation of this water heater, call toll free:

1-800-456-9805

When calling for assistance, please have the following information ready:

1. Model number
2. 7 digit product number
3. Serial number
4. Date of installation
5. Place of purchase

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Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER" or "WARNING." These words mean:

⚠ DANGER

You can be killed or seriously injured if you don't immediately follow instructions.

⚠ WARNING

You can be killed or seriously injured if you don't follow instructions.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

Important Instructions

- Do not use this appliance if any part has been under water. Immediately call a qualified service technician. Water heaters subjected to flood conditions or anytime the gas controls, main burner or electrical components have been submerged in water require replacement of the entire water heater.
- Hydrogen gas can be produced in a hot water system that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable and can ignite when exposed to a spark or flame. To prevent the possibility of injury under these conditions, we recommend the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance which is connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the faucet as water begins to flow. Do not smoke or have any open flame near the faucet at the time it is open.

The California Safe Drinking Water and Toxic Enforcement Act requires the Governor of California to publish a list of substances known to the State of California to cause cancer, birth defects, or other reproductive harm, and requires businesses to warn of potential exposure to such substances.

Warning: This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

This appliance can cause low-level exposure to some of the substances listed, including formaldehyde, carbon monoxide, and soot.

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INSTALLATION INSTRUCTIONS

Consumer Information

This water heater is design-certified by CSA International as a Category I, non-direct vented water heater which takes its combustion air either from the installation area or from air ducted to the unit from the outside.

This water heater must be installed according to all local and state codes, or in the absence of local and state codes, with the "National Fuel Gas Code", ANSI Z223.1(NFPA 54)- latest edition. Canadian installations must be performed in accordance with CAN/CSA-B149.1. This is available from the following:

American Gas Association
1515 Wilson Boulevard
Arlington, VA 22209

National Fire Protection Agency
1 Batterymarch Park
Quincy, MA 02269

Canadian Standards Association
5060 Spectrum Way
Mississauga, ON
L4W 5N6

Check the phone listings for the local authorities having jurisdiction over this installation.

Installer and Owner Responsibilities

This manual has been prepared to acquaint you with the installation, operation and maintenance of this gas water heater and provide important safety information in these areas.

Read all of the instructions thoroughly before attempting the installation or operation of this water heater. Keep this manual for future reference.

Do not discard this manual. You or future users of this water heater will need it for future reference.

The manufacturer and seller of this water heater will not be liable for any damages, injuries or deaths caused by failure to comply with the installation and operating instructions outlined in this manual.

The manufacturer of this water heater recommends that it be professionally installed by qualified service technicians. Examples of qualified service technicians include: those trained in the plumbing and heating industry, local gas utility personnel or an authorized service person.

Massachusetts code requires this water heater to be installed in accordance with Massachusetts Plumbing and Fuel Gas Code 248 CMR Sections 2.00 and 5.00.

A data plate identifying this water heater can be found on the front of the water heater. When referring to this water heater always have the information listed on the data plate readily available.

Retain your original receipt as proof of purchase.

Unpacking the Water Heater

WARNING

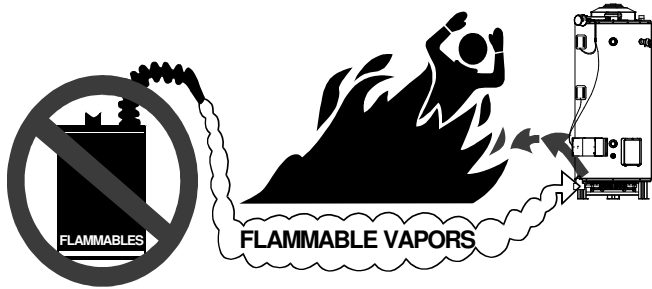
Excessive Weight Hazard
Use two or more people to move and install water heater unless proper handling equipment is utilized.
Failure to do so can result in back or other injury.

Removing Packaging Materials

Important: Do not remove any permanent instructions, labels, or the data label from outside of the water heater or on the inside of panels.

- Remove exterior packaging and place installation components aside.
- Inspect all parts for damage prior to installation and start-up.
- Completely read all instructions before attempting to assemble and install this product.
- After installation, dispose of packaging material in the proper manner.

⚠ WARNING



⚠ Vapors from flammable liquids will explode and catch fire causing death or severe burns.

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

Keep flammable products:

- 1. far away from heater**
- 2. in approved containers,**
- 3. tightly closed and**
- 4. out of children's reach.**

This water heater has a main burner and an automatic ignition system. The ignition system:

- 1. can come on at any time and**
- 2. will ignite flammable vapors.**

Vapors:

- 1. cannot be seen,**
- 2. are heavier than air,**
- 3. go a long way on the floor and**
- 4. can be carried from other rooms to the water heater by air currents.**

Do not install this water heater where flammable products will be stored.

Installation Requirements

The water heater must be installed according to all local and state codes, or in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1 (NFPA 54)-latest edition. Canadian installations must be performed in accordance with CAN/CSA-B149.1.

Note: In the State of California, the water heater must be braced, anchored, or strapped to avoid moving during an earthquake. Contact local utilities for code requirements in your area or call 1-800-456-9805 and request instructions.

Site Location

- Select a location near the center of the water piping system. The water heater must be installed indoors and in a vertical position on a level surface. **DO NOT** install in bathrooms, bedrooms, or any occupied room normally kept closed.
- Locate the water heater as close to the gas vent as practical. Consider the vent system piping and combustion air supply requirements when selecting the water heater location. The venting system must be able to run from the water heater to termination with minimal length and elbows.
- Locate the water heater near the existing gas piping. If installing a new gas line, locate the water heater to minimize the pipe length and elbows.
- The water heater should be located in an area not subject to freezing temperatures. Water heaters located in unconditioned spaces (i.e., attics, basements, etc.) may require insulation of the water piping and drain piping to protect against freezing. The drain and controls must be easily accessible for operation and service. Maintain proper clearances as specified on the data plate.
- The operation of air-moving devices such as exhaust fans, ventilation systems, clothes dryers, fire-places, etc., can affect the proper operation of the water heater. **Note:** Special attention must be given to the location of these devices and the conditions they may create. Flow reversal of flue gases may cause an increase of carbon monoxide inside of the dwelling.

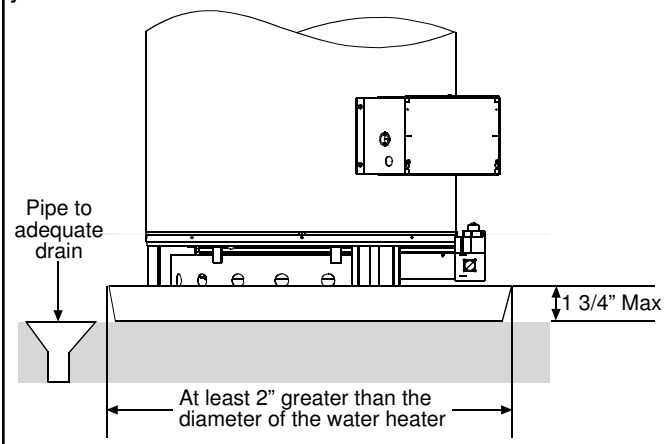
Important: Air for combustion and ventilation must not come from a corrosive atmosphere. Any failure due to corrosive elements in the atmosphere is excluded from warranty coverage.

The following types of installation (but not limited to the following) will require outdoor air for combustion due to chemical exposure, and may reduce but not eliminate the presence of corrosive chemicals in the air:

- Beauty shops
- Photo processing labs
- Buildings with indoor pools
- Water heaters installed in laundry, hobby or craft rooms
- Water heaters installed near chemical storage areas

Important:

The water heater should be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the water heater or to lower floors of the structure. **Due to the normal corrosive action of the water, the tank will eventually leak after an extended period of time.** A suitable metal drain pan should be installed under the water heater as shown below, to help protect the property from damage which may occur from leaks in the piping connections or tank. The pan must limit the water level to a maximum depth of 1 3/4 inches (45mm) and be 2 inches (51mm) wider than the water heater and piped to an adequate drain. **The pan must not restrict combustion airflow.** Locate the water heater near a suitable indoor drain. Outside drains are subject to freezing temperatures which can obstruct the drain line. The piping should be at least 3/4" (19mm) ID and pitched for proper drainage. Under no circumstances will the manufacturer or seller of this water heater be held liable for any water damage which is caused by your failure to follow these instructions.



Clearances and Accessibility

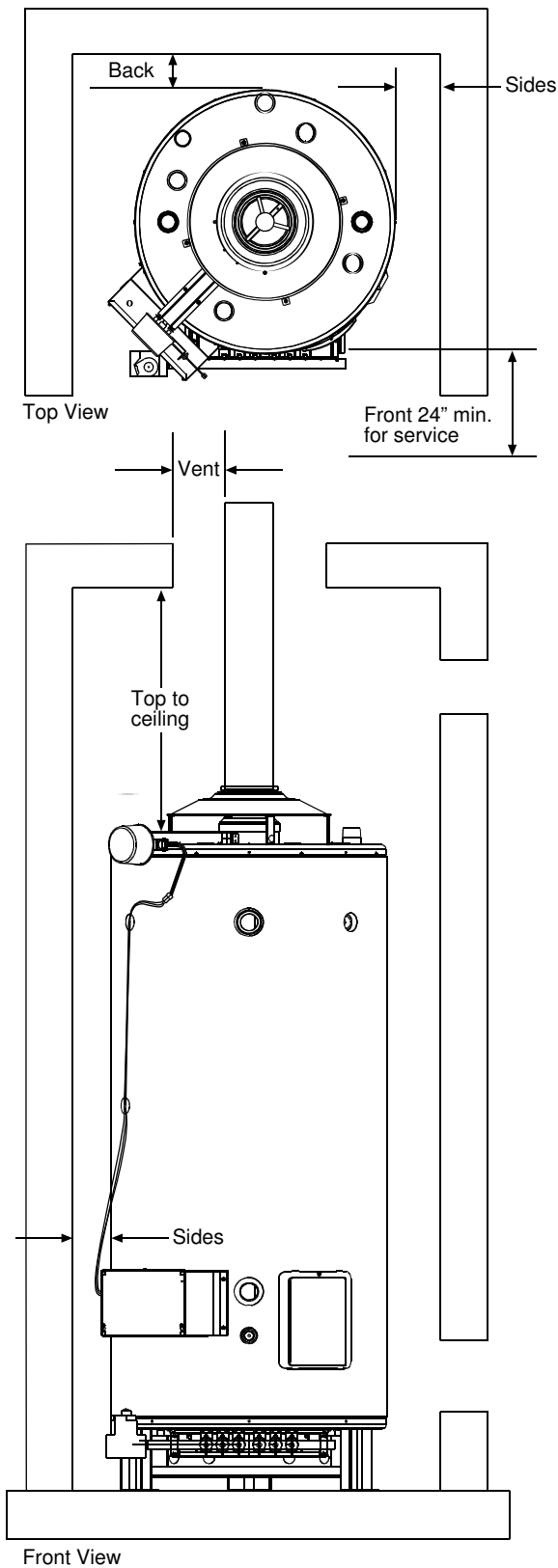
Notice: Minimum clearances from combustible materials are stated on the data plate located on the front of the water heater.

- If the water heater is installed in a restaurant or food service location where the floor is cleaned frequently, NSF International requires the water heater to maintain 6 inches (150mm) of clearance above the floor. To comply with the NSF International requirement, install leg extension kit. For availability contact 1-800-456-9805
- The water heater is certified for installation on a combustible floor.

Important: If installing over carpeting, the carpeting must be protected by a metal or wood panel beneath the water heater. The protective panel must extend beyond the full width and depth of the water heater by at least 3 inches (76mm) in any direction, or if in an alcove the entire floor must be covered by the panel. The panel must be strong enough to carry the weight of the water heater when full of water.

Figure 1 may be used as a reference guide to locate the specific clearance locations. A minimum of 24 inches (610mm) of front clearance and 4 inches (102mm) on each side should be provided for inspection and service.

Figure1: Minimum Clearance Locations



COMBUSTION/VENT PIPE SYSTEM

WARNING

Carbon Monoxide Hazard

Follow all instructions to locate and install the vent pipe system.

Instructions can be found in this manual, in state or local codes (or the authority having jurisdiction), or in the absence of such, the National Fuel Gas Code, ANSI Z223.1, NFPA 54, Latest Edition. Canadian installations must be performed in accordance with CAN/CSA-B149.1

Failure to properly locate and install the vent pipe system can result in death, explosion, or carbon monoxide poisoning.

Combustion

Combustion air must be free of acid-forming chemicals. These chemicals are found in aerosol sprays, detergents, bleaches, cleaning solvents, air freshener, paint and varnish removers, refrigerant, and many other commercial products. When burned, vapors from these products form highly corrosive acid compounds. These products should not be stored or used near the water heater or air inlet.

Venting

Vent pipe installation must be installed according to all state and local codes, or in the absence of local and state codes, the National Fuel Gas Code, NFPA 54, ANSI Z223.1-latest edition. Canadian installations must be performed in accordance with CAN/CSA-B149.1

It is the responsibility of the installing contractor to provide a vent adequate in capacity and in good usable condition. Btu/hr capacity limitations are governed by the style and height of the vent/chimney. For installations in the United States, capacity tables are available in the National Fuel Gas Code (ANSI Z223.1- latest edition). Canadian installation information can be found in CAN/CSA-B149.1

U.L. recognized fuel gas and carbon monoxide (CO) detectors are recommended in all applications and should be installed using the manufacturer's instructions and local codes, rules, or regulations.

Important: Check to make sure the vent pipe is not blocked in any way.

- Venting should be as direct as possible with a minimum number of pipe fittings.
- Exhaust gas vents must be installed with U.L. listed type B vent pipe according to the vent manufacturer's instructions and the terms of its listing.
- Single wall vent connectors must have 6" (152mm) of clearance from unprotected combustible surfaces.
- If sidewall venting is necessary, a power vent kit is required. For availability contact 1-800-456-9805.
- Vents that run through unconditioned spaces where below freezing temperatures are expected should be properly insulated to prevent freezing.
- Existing vent systems must be inspected for obstructions, corrosion and proper installation.
- Vents must be connected to the water heater's draft hood by a certified vent connector or by directly originating at the draft hood opening.
- Vertical gas vents must terminate with a listed cap or other roof assembly and be installed according to their manufacturer's instructions.
- Horizontal vent connections must have an upward slope of at least 1/4" (6mm) per foot (305mm).
- Gas vents must be supported to prevent damage, joint separation, and maintain clearances to combustible materials.
- Vent connection joints should be fastened by sheet metal screws or by other approved methods.
- Vent and vent connectors should have adequate support to keep weight off the draft hood.

All pipe, fittings, and procedures must conform to American National Standard Institute and American Society for Testing and Materials (ANSI/ASTM) standards in the United States.

Important: If you lack the necessary skills required to properly install this venting system, you should not proceed, but get help from a qualified service technician.

Air Requirements

WARNING

An adequate air supply shall be provided for combustion and ventilation of this water heater.

An insufficient supply can result in poor combustion and possible sooting of the burner, combustion chamber or flue passageway. This may present a potential fire hazard or could create a serious health hazard by producing carbon monoxide.

General

Where an exhaust fan or any other air consuming appliance (Eg. Clothes dryer, furnace, etc.) is installed in the same space as the water heater, sufficient air openings must be available to provide fresh air when all appliances are operating simultaneously.

The area in which the heater is located is classified as either “an unconfined space” or “a confined space.”

An unconfined space is defined as a space having a volume not less than 50 cubic feet per 1000 BTU/hour (4.8 cubic meters per kilowatt) of combined input rating of all appliances using the space. Adjacent open rooms may be included as part of the unconfined space.

There shall be no closeable doors between these rooms. An example of this is an open basement.

A confined space is one smaller than described above. Air shall be supplied through permanent openings as described in Figure 2. **At no time shall an air opening have a dimension of less than 3” (75 mm)** and at no time shall any top opening be lower than the top of the water heater.

For buildings that are not well sealed (do not have tight fitting doors and windows) natural air infiltration may provide sufficient air required for combustion and ventilation. For buildings using tight construction (newer and renovated structures), the air supply shall be introduced from the outdoors, regardless of whether the space is confined or unconfined.

Combustion Air “Supply” Ducts

Air supply ducts shall be of galvanized steel or equivalent corrosion resistant material. A single air duct may not be substituted when required for upper and lower air openings. Horizontal upper combustion air ducts shall not slope downward toward the air inlet.

Louvers and Grills

Openings for air supply ducts must provide free unobstructed air movement. Louver and grill openings must be sized to ensure that the FREE OPEN AREA is never less than the area of the air duct.

LOCATION:

The location for top and bottom openings are as follows;

For U.S. installations:The top opening shall commence within 12” (300 mm) of the top of space and the bottom opening shall commence within 12” (300mm) of the bottom of the enclosure.

For Canadian installations:The top opening shall be located as close to the ceiling as practical but never lower than the relief opening of the lowest draft control device. The bottom opening shall be located neither more than 18 inches (450 mm), nor less than 6 inches (150 mm), above floor level.

Air Opening Requirements

(a) EQUIPMENT LOCATED IN CONFINED SPACES; ALL AIR FROM INSIDE THE BUILDING.

Two permanent openings (top and bottom) shall be provided connecting the confined space (e.g., closet/small room) with the unconfined space. Each opening shall have a free area of one square inch per 1,000 BTU/hour (22 cm²/kW) input of all appliances in the confined space, but not less than 100 square inches (645 cm²).

b) BASEMENT INSTALLATION, EQUIPMENT LOCATED IN CONFINED SPACES; ALL AIR FROM OUTDOORS.

Outside air inlets shall be a minimum of 12" (300mm) above the grade (snow) line. When supplying air directly from the outdoors:

For American installations: Two openings (top and bottom) shall be provided with each opening having a minimum free area of one square inch per 4,000 BTU/hour input (5.5 cm²/kW) of total input rating of all appliances in the confined space.

For Canadian installations: Canadian codes specify single air supply source. Canadian customers and authorities having jurisdiction may use the sizing listed in Table 1. When using a single air supply, the duct shall terminate within 1 foot (300 mm) above and within 2 feet (600 mm) horizontally from the burner level of the appliance having the largest input.

Combined input of all appliances in confined space	Required free area of duct	Acceptable Equivalent duct diameter	
		A ₁	B ₂
BTU/hr(kW)	in ² (mm ²)	in(mm)	in(mm)
75,000(23)	11(7,000)	4(100)	5(125)
100,000(30)	14(9,000)	4(100)	5(125)
125,000(37)	18(12,000)	5(125)	6(150)
150,000(45)	22(14,000)	5(125)	6(150)
175,000(53)	25(16,000)	6(150)	7(175)
200,000(60)	29(19,000)	6(150)	7(175)
225,000(68)	32(21,000)	6(150)	7(175)
250,000(75)	36(23,000)	7(175)	8(200)
275,000(83)	40(26,000)	7(175)	8(200)
300,000(90)	43(28,000)	7(175)	8(200)
325,000(98)	47(30,000)	8(200)	9(225)
350,000(105)	50(32,000)	8(200)	9(225)
375,000(113)	54(35,000)	8(200)	9(225)
400,000(120)	58(37,000)	9(225)	10(250)

Notes:

1. Maximum length of ducts in column A is 20 equivalent feet (6.1 meters).
2. Maximum length of ducts in column B is 50 equivalent feet (15.2 meters).

(c) EQUIPMENT LOCATED IN CONFINED SPACES; ALL AIR FROM OUTDOORS.

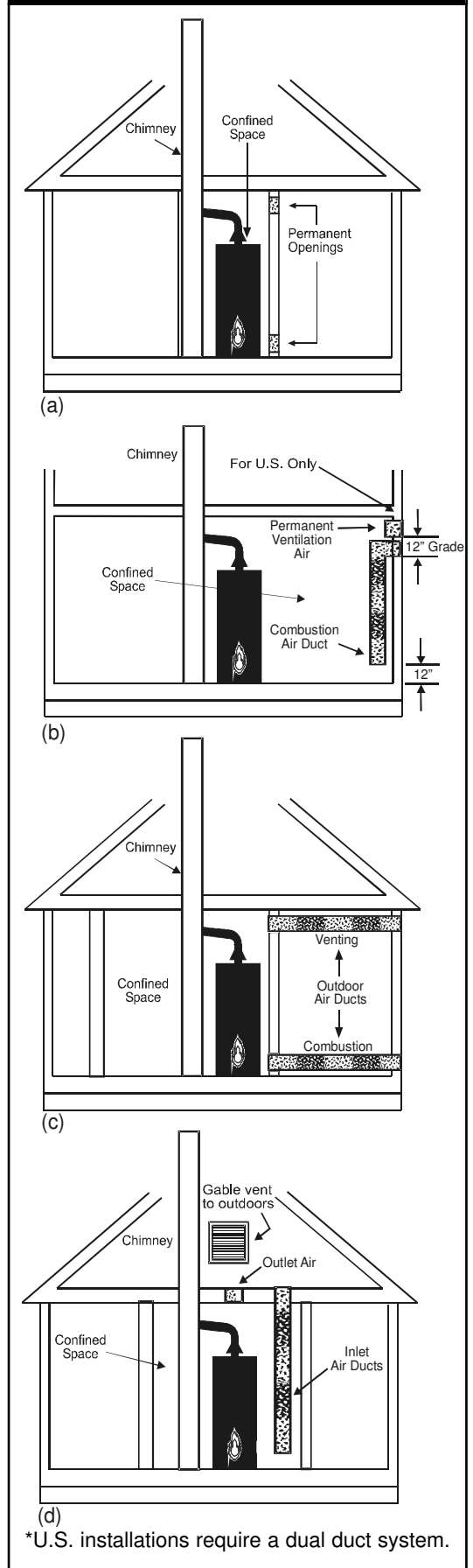
For American installations: When supplying air directly from the outdoors using horizontal ducting, each opening shall have a free minimum area of one square inch per 2,000 BTU/hour (11 cm²/kW) of total input rating of all appliances in the confined space.

For Canadian installations: Refer to Table 1 of part (b).

(d) EQUIPMENT LOCATED IN CONFINED SPACES; ALL AIR FROM OUTDOORS THROUGH VENTILATED ATTIC.

For American installations: When supplying air directly through vertical ducting, each opening shall have a free minimum area of one square inch per 4,000 BTU/hour (5.5 cm²/kW) of total input rating of all appliances in the confined space.

Figure: 2 Equipment Location and Combustion/Ventilation Air Requirements



Draft Hood/Damper Installation

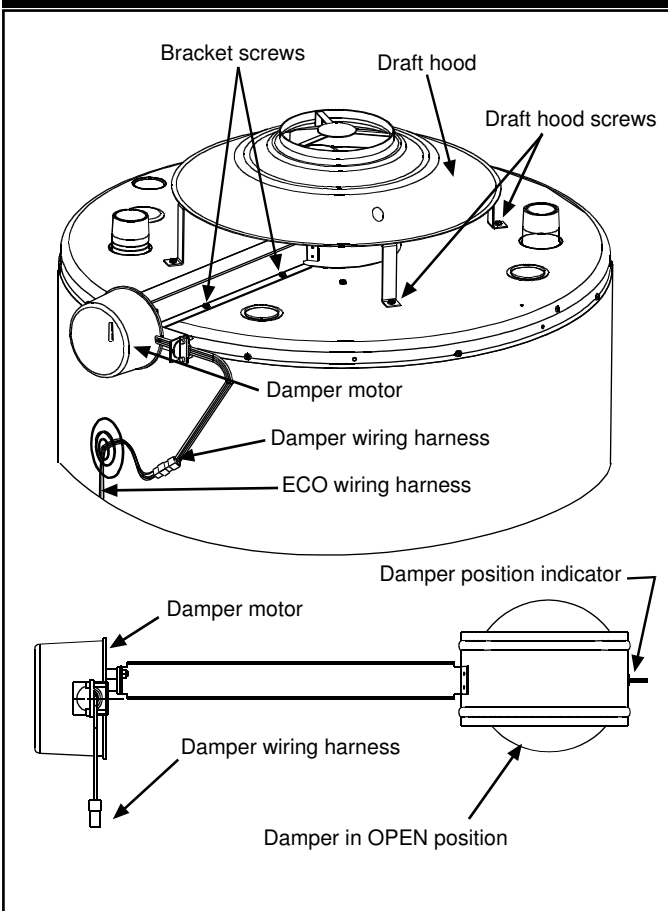
! WARNING

Do not operate water heater with damper in closed position, it must be in the open position during water heater operation. Do not negate the action of any existing safety or operational controls.

Install the supplied draft hood and damper on the flue outlet collar. Use only the supplied draft hood and damper, DO NOT use any substitute or alter the components in any way.

Place the damper on the water heater (see figure 3A). Align the four pilot holes on top of the water heater with the 4 corresponding holes on the damper bracket and secure with the supplied screws. Next, align the draft hood legs with the 4 corresponding pilot holes on top of the water heater and attach securely with the supplied screws. Locate the wiring from the ECO, and attach it to the wiring harness on the damper (see Figure 3A). Once damper is installed, ensure that the damper position indicator is visible (See figure 3A).

Figure 3A: Flue Damper Assembly

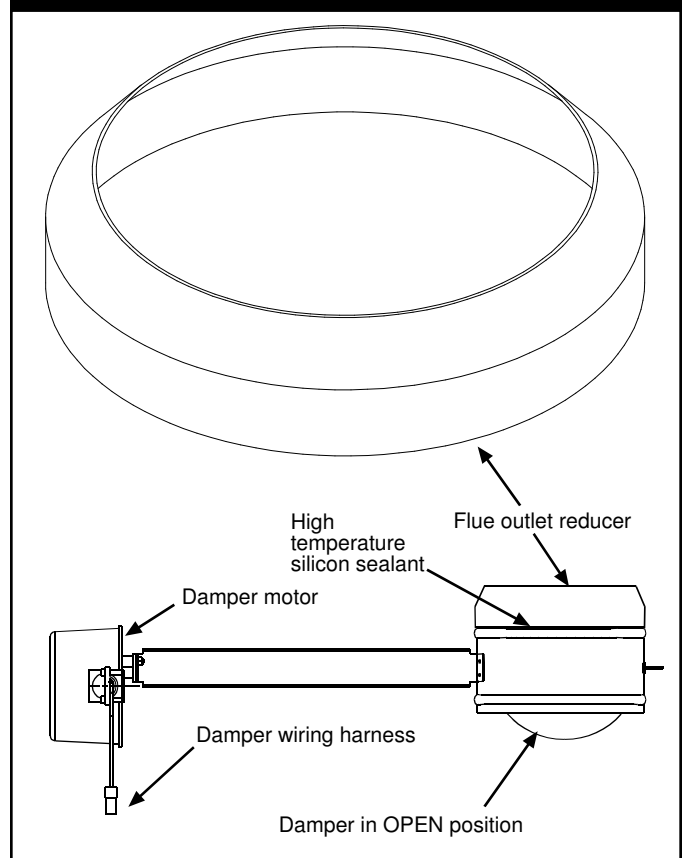


Flue Outlet Reducer

Some units are shipped with a flue outlet reducer (See Figure 3B). Use only the flue outlet reducer supplied with this unit. The flue outlet reducer should be connected to the top of the flue damper and sealed by high temperature silicon.

The vent pipe must be installed according to all local and state codes or, in the absence of local and state codes, the "National Fuel Gas Code", ANSI Z223.1 (NFPA 54)-latest edition.

Figure 3B: Flue Outlet Reducer



WATER SYSTEM PIPING

Piping Installation

Piping, fittings, and valves should be installed according to the installation drawing (Figure 4). If the indoor installation area is subject to freezing temperatures, the water piping must be protected by insulation.

Water supply pressure should not exceed 80% of the working pressure of the water heater. The working pressure is stated on the water heater's data plate. If this occurs, a pressure reducing valve with a bypass should be installed in the cold water inlet line to the entire system. This should be placed on the supply to the entire structure in order to maintain equal hot and cold water pressures.

Note: Water supplied to the unit that exceeds 12 grains (205 mg/l) total hardness may reduce the life and performance of the water heater. Depending on the degree of hardness, it is recommended that either a water pre-treatment system or a water softener be installed and properly maintained.

Important: Heat cannot be applied to the water fittings on the water heater as they may contain nonmetallic parts. If solder connections are used, solder the pipe to the adapter before attaching the adapter to the hot and cold water fittings.

1. The water heater may have three water piping connection points. The top and front are 1 1/2" NPT and the connections on the back of some heaters are 2" NPT. When using front or back connections a nipple inlet tube combination is required. For availability contact 1-800-456-9805.

Note: Inlet and outlet piping connections cannot be mixed. For example, a top inlet connection must use a top outlet connection.

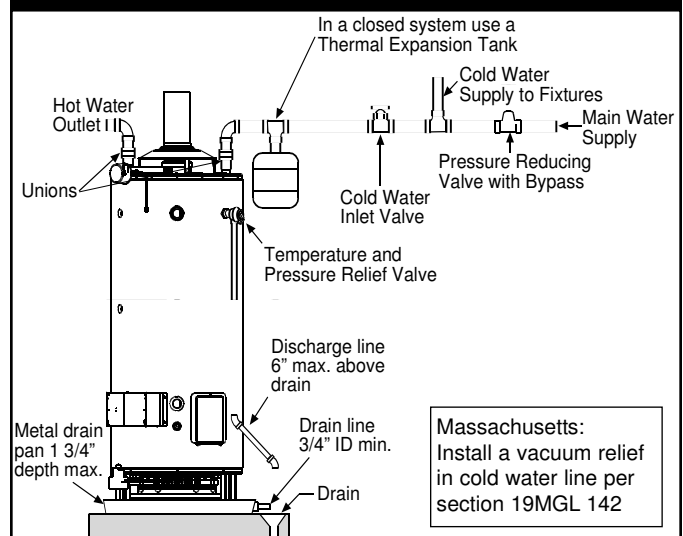
2. The installation of unions in both the hot and cold water supply lines is recommended for ease of removing the water heater for service or replacement.
3. Since most commercial installations utilize higher temperatures, **the use of a tempering valve is strongly recommended in all domestic hot water lines (i.e. public restroom sinks, etc).**
4. If installing the water heater in a closed water system, install an expansion tank in the cold water line as specified under "Closed System/Thermal Expansion" (Page 12).
5. Install a shut-off valve in the cold water inlet line. It should be located close to the water heater and be easily accessible. Know the location of this valve and how to shut off the water to the heater.
6. The water heater is shipped with a factory-installed Temperature and Pressure Relief Valve. Install a discharge line in the opening in the T & P valve (see instructions on Page 13).
7. After piping has been properly connected to the water heater, remove the aerator at the nearest hot water faucet. Open the hot water faucet and allow the tank to completely fill with water. To purge the lines of any excess air, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained. Close the faucet and check all connections for leaks.

Space Heating

If this unit is to be used to supply both space heating and domestic potable (drinking) water then the following instructions must be followed:

1. All piping and components used must be suitable for use with domestic (potable) drinking water.
2. Do not use piping or components that have been connected to a nonpotable system or treated with chromates or other toxic chemicals. Do not add any chemicals to the water heater piping.
3. If system requires temperatures in excess of 120°F (49°C) install a tempering valve, per the manufacturers instructions, in the domestic (potable) hot water line to limit the risk of scalding (See Figure 5).
4. Be sure to follow the manual(s) shipped with the heating system. Also follow any state or local codes.

Figure: 4 Water Piping Installation



Tempering Valve Installation

A Tempering Valve should be installed per the manufacturer's instructions in the hot water line. See Figure 5 (below) for sample tempering valve installation.

Figure 5: Tempering Valve

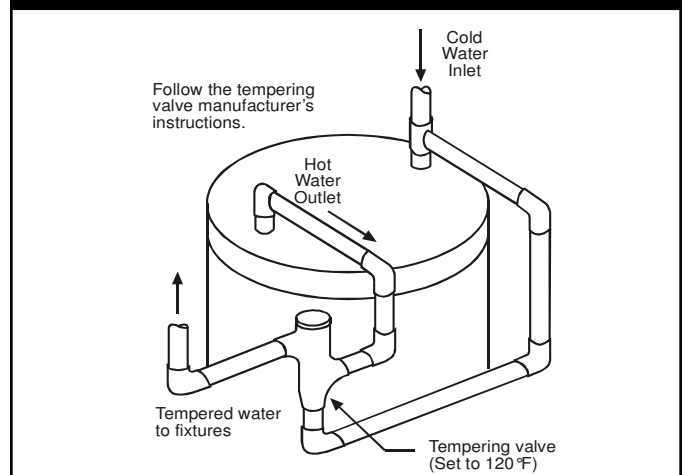


Figure 6: Commercial Unit with Auxiliary Booster Heater - Two Temperature (With or Without Building Recirculation)

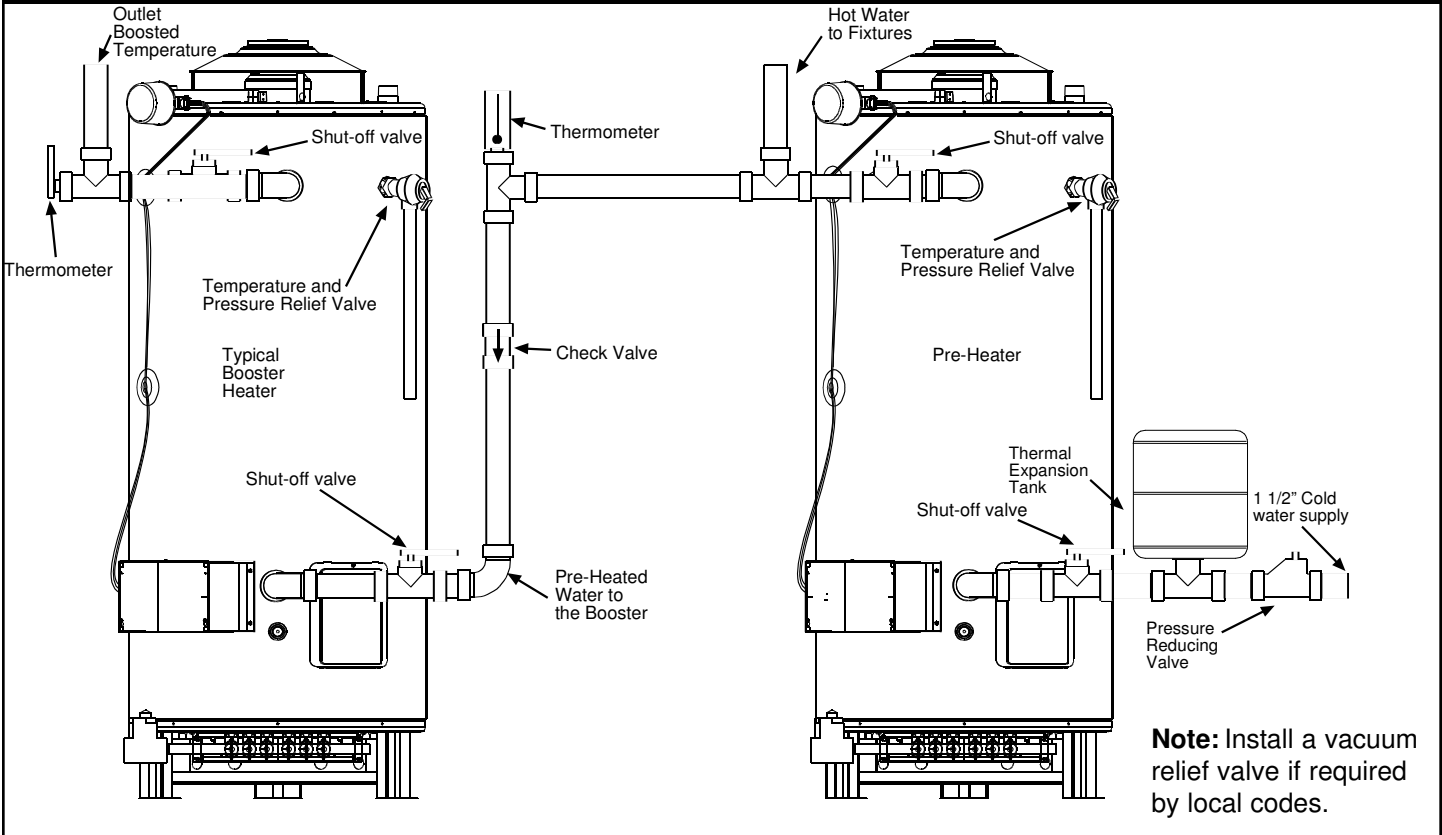
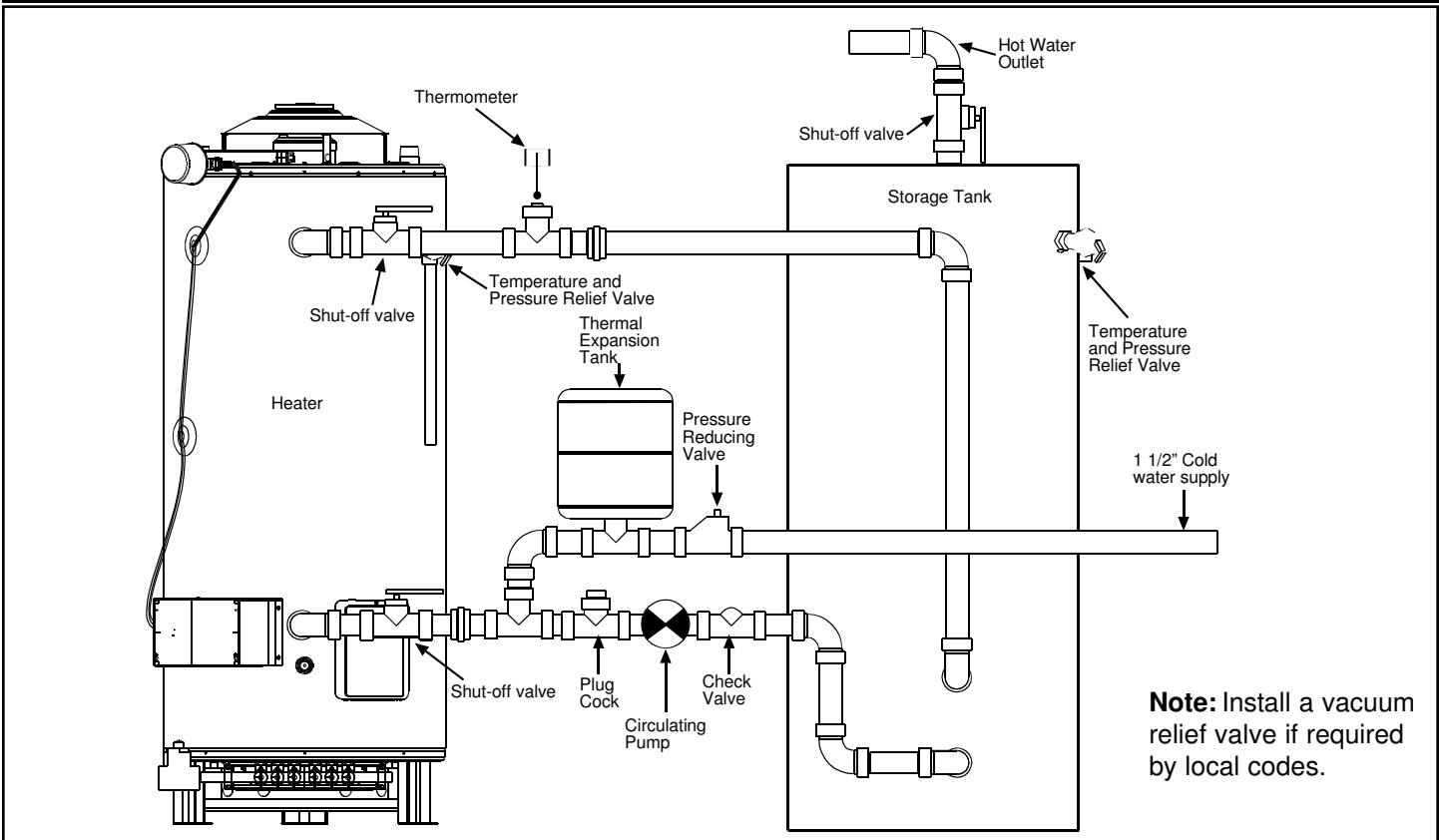
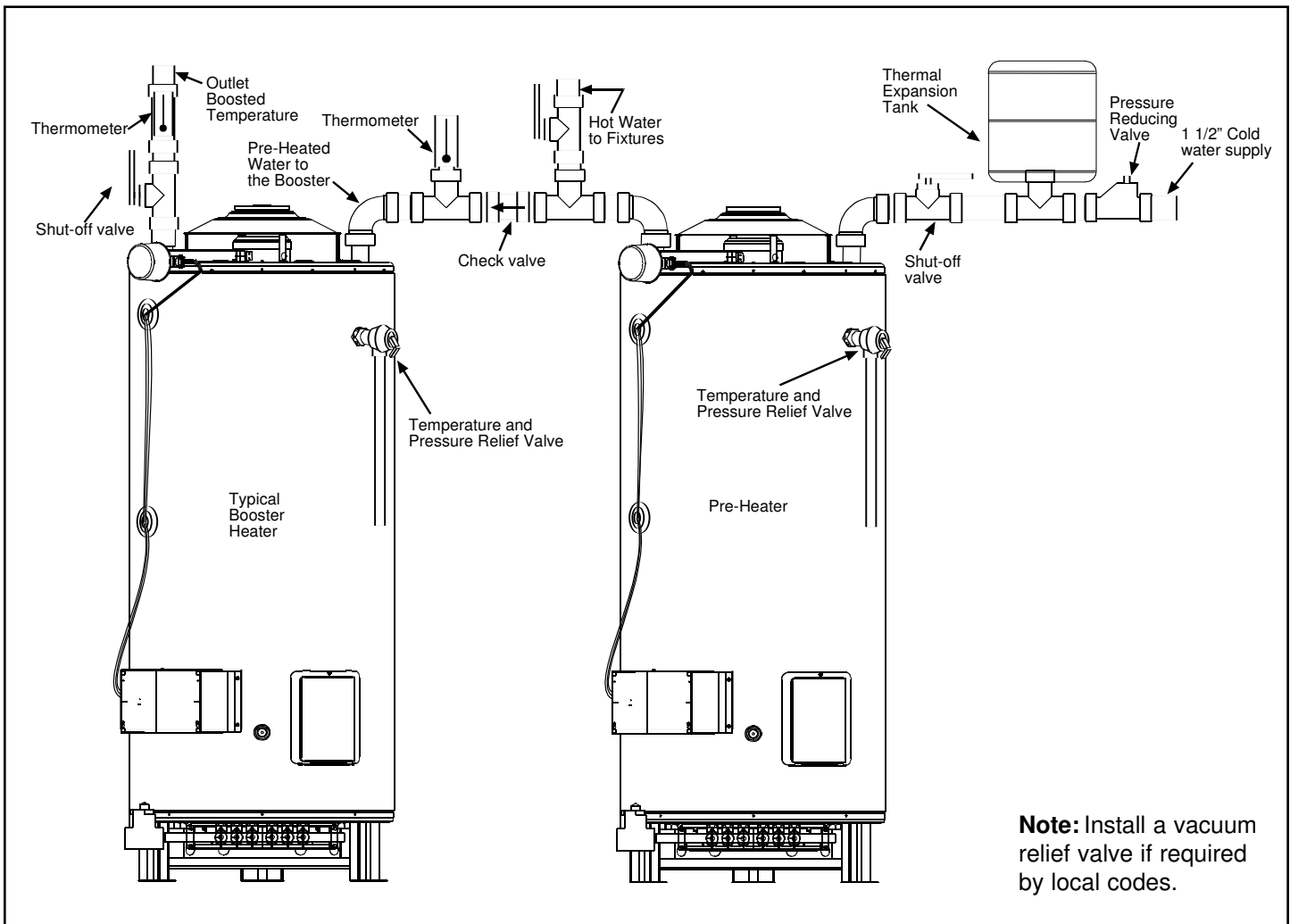


Figure 7: Commercial Unit with Auxiliary Storage Heater - Forced Circulation With or Without Building Recirculation - Front Inlet/Outlet Connections



**Figure 8: Commercial Unit with Auxiliary Storage Heater - Forced Circulation
With or Without Building Recirculation - Top Inlet/Outlet Connections**



Please note the following:

- DO NOT** install this water heater with iron piping. The system should be installed only with piping that is suitable for potable (drinkable) water such as copper, CPVC, or polybutylene. **DO NOT** use PVC water piping.
- DO NOT** use any pumps, valves, or fittings that are not compatible with potable water.
- DO NOT** use valves that may cause excessive restriction to water flow. Use full flow ball or gate valves only.
- DO NOT** use 50/50 tin-lead solder (or any lead based solder) in potable water lines. Use 95/5 tin-antimony or other equivalent material.
- DO NOT** tamper with the gas valve/thermostat, igniter, or temperature and pressure relief valve. Tampering voids all warranties. Only qualified service technicians should service these components.
- DO NOT** use with piping that has been treated with chromates, boiler seal, or other chemicals.
- DO NOT** add any chemicals to the system piping which will contaminate the potable water supply.

Closed System/Thermal Expansion

Periodic discharge of the temperature and pressure relief valve may be due to thermal expansion in a closed water supply system. The water utility supply meter may contain a check valve, backflow preventer or water pressure reducing valve. This will create a closed water system. During the heating cycle of the water heater, the water expands causing pressure inside the water heater to increase. This may cause the temperature and pressure relief valve to discharge small quantities of hot water. To prevent this, it is recommended that a diaphragm-type expansion tank (suitable for potable water) be installed on the cold water supply line. The expansion tank must be properly sized for the application. Contact the local water supplier or plumbing inspector for information on other methods to control this situation.

Important: Do not plug or remove the temperature and pressure relief valve.

Temperature and Pressure Relief Valve

⚠ WARNING



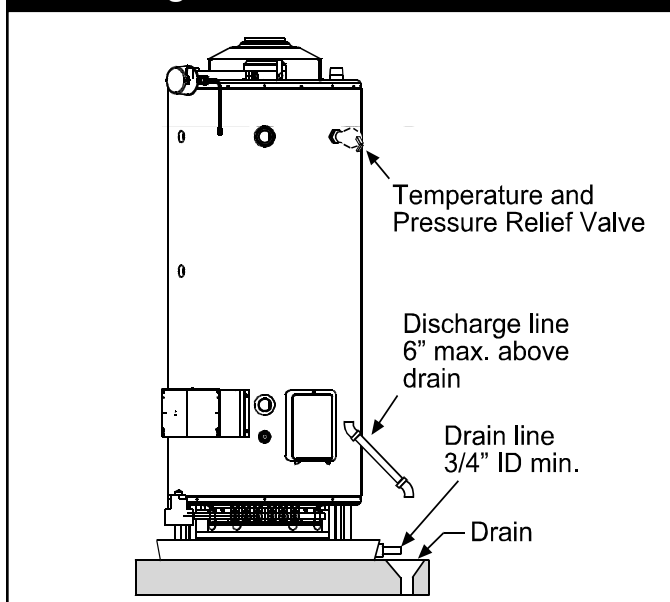
Explosion Hazard

If the temperature and pressure relief valve is dripping or leaking, have a qualified service technician replace it.

- Do not plug valve.
- Do not remove valve.

Failure to follow these instructions can result in death or explosion.

Figure 9: T&P Relief Valve



For protection against excessive pressures and temperatures, a temperature and pressure relief valve must be installed in the opening marked "T & P RELIEF VALVE" (See Figure 9). This valve must be design certified by a nationally recognized testing laboratory that maintains periodic inspection of the production of listed equipment or materials as meeting the requirements for Relief Valves and Automatic Shut-off Devices for Hot Water Supply Systems, ANSI Z21.22. (CSA4.4, Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves in Canada). The function of the temperature and pressure relief valve is to discharge water in large quantities in the event of excessive temperature or pressure developing in the water heater. The valve's relief pressure

must not exceed the working pressure of the water heater as stated on the data plate.

Important: Only a new temperature and pressure relief valve should be used with this water heater. Do not use an old or existing valve as it may be damaged or not adequate for the working pressure of the new water heater. Do not place any valve or piping between the relief valve and the tank.

The Temperature & Pressure Relief Valve:

- Must not be in contact with any electrical part.
- Must be connected to an adequate discharge line.
- Must not be rated higher than the working pressure shown on the data plate of the water heater.
- The BTUH rating of the T & P valve must be greater than, or equal to, the input rating of the water heater.

The Discharge Line:

- Must not be smaller than the pipe size of the relief valve or have any reducing coupling installed in the discharge line.
- Must not be capped, blocked, plugged or contain any valve between the relief valve and the end of the discharge line.
- Must terminate a maximum of 6 inches (152mm) above a floor drain or external to the building.
- Must be capable of withstanding 250°F (121°C) without distortion.
- Must be installed to allow complete drainage of both the valve and discharge line.

GAS SUPPLY AND PIPING

⚠️ WARNING



Explosion Hazard

Use a new AGA or CSA approved gas supply line.

Install a shut-off valve.

Do not connect a natural gas water heater to a L.P. gas supply.

Do not connect a L.P. gas water heater to a natural gas supply.

Failure to follow these instructions can result in death, explosion, or carbon monoxide poisoning.

Gas Requirements

Read the data plate to be sure the water heater is made for the type of gas being used. This information will be found on the data plate located on the front of the water heater. If the information does not agree with the type of gas available, do not install or operate the water heater. Call your dealer.

Note: An odorant may be added by the gas supplier to the gas used by this water heater. This odorant may fade over an extended period of time. Do not depend upon this odorant as an indication of leaking gas.

Gas Piping

The gas piping must be installed according to all local and state codes, or in absence of local and state codes, with the "National Fuel Gas Code", ANSI Z223.1 (NFPA 54)-latest edition. Canadian installations must be performed in accordance with CAN/CSA-B149.1.

Note: If using a flexible gas connector, make sure its rating tag matches or exceeds the input of the water heater.

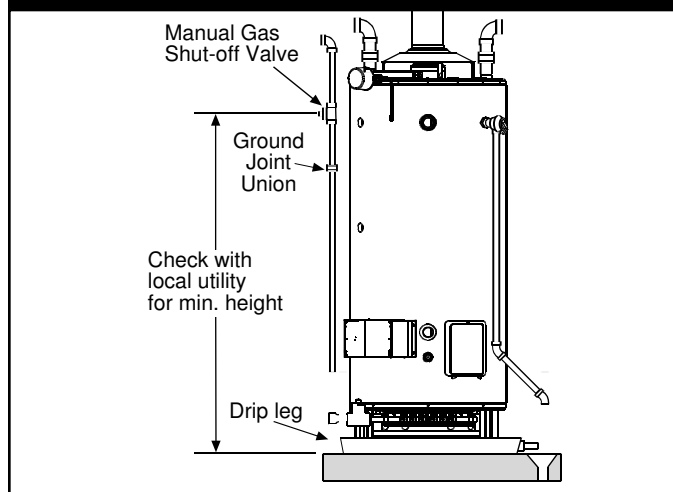
Tables 2, 3A, and 3B on page 15 provide a sizing reference for commonly used gas pipe materials. Consult the "National Fuel Gas Code" or "Natural Gas and Propane Installation Code" for the recommended gas pipe size of other materials. Follow the instructions below and reference Figure 10 for gas piping installation.

1. Install a readily accessible manual shut-off valve in the gas supply line as recommended by the local utility. Know the location of this valve and

how to turn off the gas to this unit.

2. Install a drip leg as shown. The drip leg must be no less than 3 inches (76mm) long for the accumulation of dirt, foreign material and water droplets.
3. Install a ground joint union between the water heater and the manual shut-off valve. This is to allow easy servicing.
4. Turn the gas supply on and check for leaks. Use a chloride-free soap and water solution (bubbles forming indicate a leak) or other approved method.

Figure 10: Gas Piping



Gas Pressure

Important: The gas supply pressure must not exceed the maximum supply pressure as stated on the water heater's data plate. Minimum supply pressure should also be maintained per the data plate.

Gas Pressure Testing

Important: This water heater and its gas connection must be leak tested before placing the appliance in operation.

- If the code requires the gas lines to be tested at a pressure of 14" W.C. or greater, the water heater and its manual shut-off valve must be **disconnected** from the gas supply piping system and the line capped.
- If the gas lines are to be tested at a pressure **less than 14" W.C.**, the water heater must be **isolated** from the gas supply piping system by closing its manual shut-off valve.

U.L. recognized fuel gas and carbon monoxide(CO) detectors are recommended in all applications and should be installed using the manufacturer's instructions and local codes, rules, or regulations.

Note: Air may be present in the gas lines and could prevent the burner from lighting on initial start-up. The gas lines should be purged of air by a qualified service technician after installation of the gas piping system.

⚠ WARNING



Explosion Hazard

Have a qualified service technician make sure L.P. gas pressure does not exceed 13" water column.

Failure to do so can result in death, explosion, or fire.

Table 2

Natural Gas Pipe Capacity Table (Cu. ft./hr)

Capacity of gas pipe of different diameters and lengths in cu. ft. per hr. with pressure drop of 0.3 in. and specific gravity of 0.60 (natural gas).

Nominal Iron Pipe Size, in.	Length of Pipe, Feet													
	10	20	30	40	50	60	70	80	90	100	125	150	175	200
1/2	132	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3/4	278	190	152	130	115	105	96	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1	520	350	285	245	215	195	180	170	160	150	130	120	110	100
1-1/4	1050	730	590	500	440	400	370	350	320	305	275	250	225	210
1-1/2	1600	1100	890	760	670	610	560	530	490	460	410	380	350	320

After the length of pipe has been determined, select the pipe size which will provide the minimum cubic feet per hour required for the gas input rating of the water heater. By formula:

$$\text{Cu. Ft. Per Hr. Required} = \frac{\text{Gas Input of Water Heater (BTU/HR)}}{\text{Heating Value of Gas (BTU/FT}^3\text{)}}$$

The gas input of the water heater is marked on the water heater data plate. The heating value of the gas (BTU/FT³) may be determined by consulting the local natural gas utility.

Table 3 - A

L.P. Gas Capacity Table

Maximum capacity of pipe in thousands of BTU per hour of undiluted liquefied petroleum gases (at 11 inches water column pressure). Based on a Pressure Drop of 0.5 Inch Water Column.

Nominal Iron Pipe Size, in.	Length of Pipe, Feet											
	10	20	30	40	50	60	70	80	90	100	125	150
1/2	275	189	152	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3/4	576	393	315	267	237	217	196	185	173	162	146	132
1	1071	732	590	504	448	409	378	346	322	307	275	252
1-1/4	2205	1496	1212	1039	913	834	771	724	677	630	567	511

Example: Input BTU requirement of the water heater, 199,000 BTUH
Total pipe length, 80 feet = 1" IPS required.

Table 3 - B


L.P. Gas Capacity Table

Maximum capacity of pipe in thousands of BTU per hour of undiluted liquefied petroleum gases (at 11 inches water column pressure). Based on a Pressure Drop of 0.5 Inch Water Column.

Copper Tubing OD Size, in.	Length of Pipe, Feet									
	10	20	30	40	50	60	80	100	125	
5/8	206	141	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
3/4	348	239	192	164	146	132	n/a	n/a	n/a	
7/8	536	368	296	253	224	203	174	154	137	

Example: Input BTU requirement of the water heater, 199,000 BTUH
Total pipe length, 50 feet = 7/8" IPS required.

ELECTRICAL CONNECTIONS

⚠ WARNING	
	Electrical Shock Hazard Disconnect power before servicing. Replace all parts and panels before operating. Failure to do so can result in death or electrical shock.

If you lack the necessary skills required to properly install the electrical wiring to this water heater, do not proceed but have a qualified service technician perform the installation.

When making the electrical connections, always make sure:

- The voltage and frequency correspond to that specified on the water heater data plate on the front of the water heater.
- The electrical supply has the proper overload fuse or breaker protection. The water heater draws less than 7 amps.
- Wire sizes and connections comply with all applicable codes.
- Wiring is enclosed in approved conduit (if required by local codes).
- The water heater and electrical supply are properly grounded.
- This water heater must be “hard-wired” do not use an extension cord to supply electrical power to this water heater.

Note: The wiring diagram can be found on page 17. Always reference the wiring diagram(s) for the correct electrical connections.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

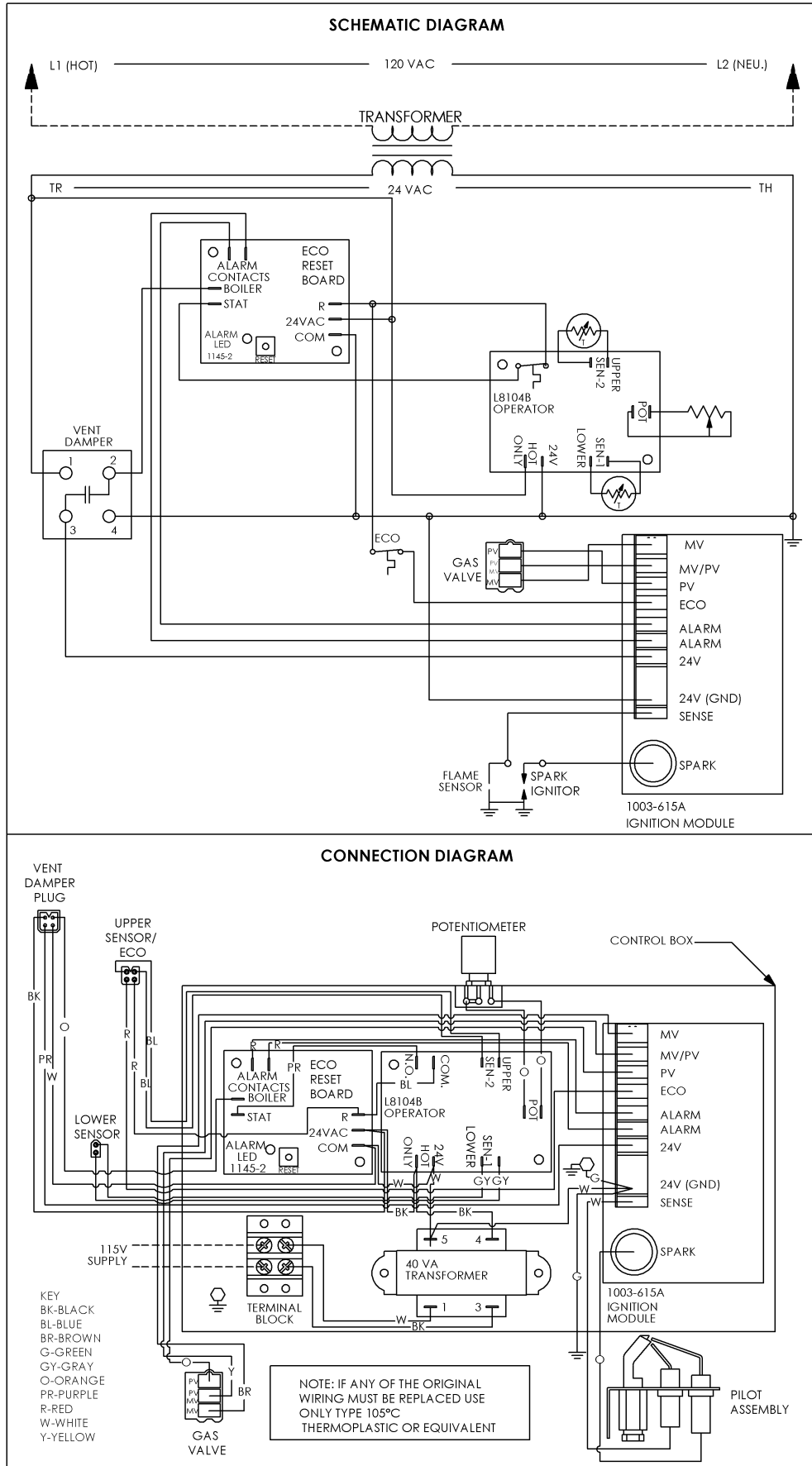
Electrical Installation

1. Shut off the power at the electrical service box.
2. Loosen the screws securing the access panel to the electrical compartment. (The electrical wiring diagram can be found on the inside of the access panel.) Set the access panel aside.
3. Connect the electrical supply to the water heater in accordance with local utility requirements and codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70 and/or the CSA C22.1, Electrical Code. Use only a dedicated electrical circuit containing a properly sized fuse or circuit breaker. Maximum overload protection should not exceed 15 Amperes.
4. Connect this circuit (directly from the electrical service box) to an electrical disconnect switch.
5. Ground the water heater by connecting the electrical service ground wire to the green ground wire (provided).

Note: The power supply to this water heater must be properly polarized, [120 volts from the hot lead (black) to ground and 0 volts from the neutral lead (white) to ground] otherwise, the unit will not operate.

6. After making all electrical connections, completely fill the tank with water and check all connections for leaks. Open the nearest hot water faucet and let it run for 3 minutes to purge the water lines of air and sediment and to ensure complete filling of the tank. The electrical power may then be turned on.

WIRING DIAGRAM



INSTALLATION CHECKLIST

Water Heater Location Requirements

- Centrally located with the water piping system. Located as close to the gas piping and vent pipe system as possible.
- Located indoors and in a vertical position. Protected from freezing temperatures.
- Proper clearances from combustibles surfaces maintained and not installed directly on a carpeted floor. Sufficient room to service the water heater.
- Provisions made to protect the area from water damage. Properly sized drain pan installed and piped to an adequate drain.
- Installation area free of corrosive elements and flammable materials.

Vent Pipe System

- Draft hood and damper properly installed
- Vent connectors securely fastened with screws and supported properly to maintain 6" (152mm) clearance.
- Vent pipe and fittings of approved material.
- Acceptable size, length, and number of elbows on exhaust outlet pipe.
- Installed in accordance with prevailing provisions of local codes, or in the absence of such, National Fuel Gas Code, NFPA 54, ANSI Z223.1-Latest Edition. Canadian Installations must be performed in accordance with CAN/CSA-B149.1.
- Draft hood or vent pipe should not be obstructed in any way.

Vent Termination

Vertical

- Vertical gas vents must terminate with a listed cap or other roof assembly and be installed according to their manufacturer's instructions.

Water System Piping

- Temperature and pressure relief valve properly installed with a discharge line run to an open drain and protected from freezing.
- All piping properly installed and free of leaks.
- Water heater completely filled with water.
- A properly sized expansion tank must be installed on all closed systems.
- A tempering valve should be installed per the manufacturer's instructions.

Gas Supply and Piping

- If using a flexible gas connector, make sure its rating tag matches or exceeds the input of the water heater.
- Adequate pipe size and of approved material.
- Gas supply is the same type as listed on the water heater data plate.
- Gas line equipped with full opening shut-off valve, union and drip leg.
- Approved pipe joint compound used.
- Chloride-free soap and water solution or other approved means used to check all connections and fittings for possible gas leaks.

Electrical Connections

- Unit must be "hard-wired" to a dedicated 120V power supply
- Proper polarity.
- Water heater properly grounded.
- Installed in accordance with prevailing provisions of local codes, or in the absence of such, National Electrical Code, ANSI/NFPA 70 and/or the CSA C22.1, Electrical Code.

OPERATING YOUR WATER HEATER

Read and understand these directions thoroughly before attempting to operate the water heater (see Lighting Instructions on page 20). Check the data plate on the front of the water heater for the correct gas. Do not use this water heater with any gas other than the one listed on the data plate. If you have any questions or doubts, consult your gas supplier or gas utility company.

L.P. (Propane) Models

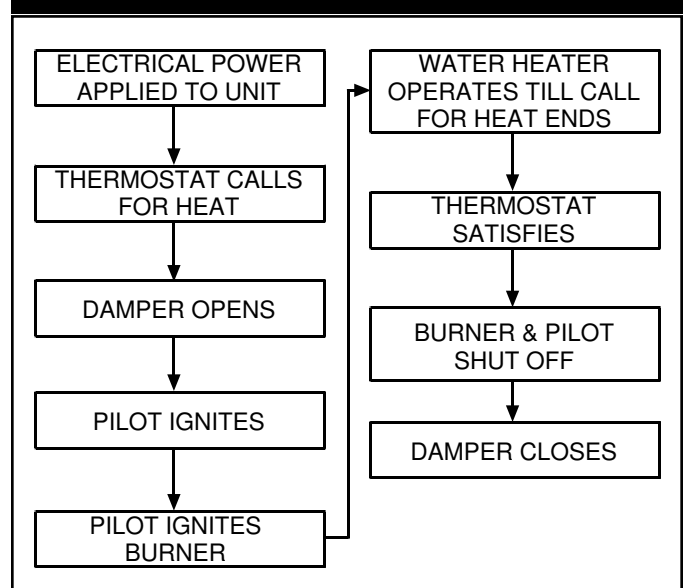
Propane gas is heavier than air and in the occurrence of a leak in the system, the gas will settle on the floor level. Basements, crawl spaces, skirted areas under mobile homes (even when ventilated), closets and areas below ground level will serve as pockets for the accumulation of gas. Before lighting a propane gas water heater, smell all around the appliance at floor level. If you smell gas, follow the instructions as given in the warning on the front page.

When your propane tank runs out of fuel, turn off the gas at all gas appliances including pilot lights. After the tank is refilled, all appliances must be re-lit according to their manufacturer's instructions.


Water Heater Operation

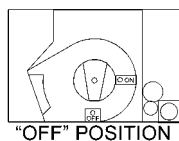
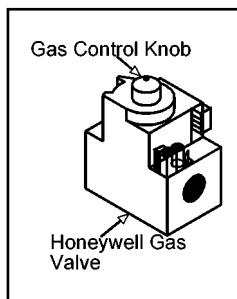
When the thermostat calls for heat, it will signal the damper to open. Once the damper fully opens, it will signal the igniter to light the pilot. The pilot will then ignite the main burners. The water heater will operate until the call for heat ends. At this time the main burners and pilot will shut-off and the damper will close. See Figure 12 below for a sequence of operation flowchart.

Figure 12: Sequence of Operation




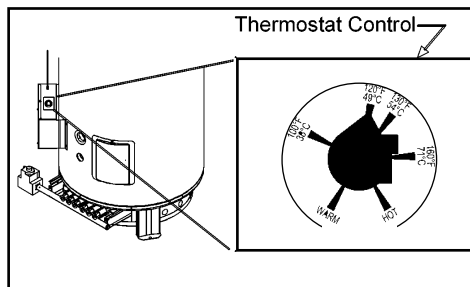
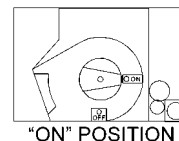
OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Turn off all electric power to the appliance.
3. Set the thermostat to the lowest setting.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Turn the gas control knob clockwise  to the "OFF" position. Do not force.



6. Wait ten (10) minutes to clear any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.


7. Turn gas control knob counterclockwise  to "ON".
8. Set thermostat to desired setting.
9. Turn on all electric power to the appliance.



10. If the appliance will not operate after three automatic tries, follow these instructions once more. If the appliance still refuses to light, follow the instructions "To Turn Off Gas To Appliance" and call a qualified service technician.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Set the thermostat to lowest setting.

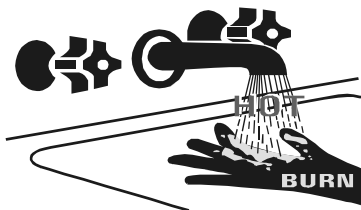
3. Turn the gas control knob clockwise  to the off position. Do not force.

Stacking

Stacking occurs when a series of short draws of hot water are taken from the water heater tank. This causes increased cycling of the burner and can result in increased water temperatures at the hot water outlet. A tempering valve should be installed in the hot water supply line to reduce the risk of scald injury.

Water Temperature Regulation

! WARNING



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

Feel water before bathing or showering.

Temperature limiting valves are recommended.

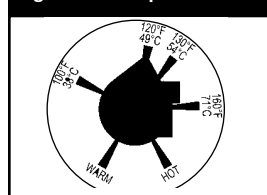
The thermostat is adjusted to its lowest temperature setting when it is shipped from the factory. Water temperature can be regulated by moving the temperature dial to the preferred setting. The preferred starting point is 120°F (49°C).

Important: Since most commercial installations utilize higher temperatures, the use of a tempering valve is strongly recommended in all domestic hot water lines (i.e. public restroom sinks, etc). Auxiliary commercial equipment (i.e. dishwashers, laundry equipment, etc.) may require higher temperature settings. Refer to instruction manuals supplied with this type equipment for recommended temperature settings.

Important: Adjusting the thermostat past the 120°F (49°C) setting on the temperature dial (see Figure 13) will increase the risk of scald injury. Hot water can produce first degree burns within:

- 120°F (49°C) more than 5 minutes
- 130°F (54°C) at 20 seconds
- 140°F (60°C) at 3 seconds
- 150°F (66°C) at 1-1/2 seconds
- 160°F (71°C) at less than 1 second

Figure 13: Temperature Dial



Each water heater consists of a mechanical temperature stop set to 140°F (60°C). To set to a different setting remove the temperature dial knob, loosen the shaft nut and re-position the mechanical temperature stop. Tighten the shaft nut and replace the temperature dial knob.

Emergency Shut Down

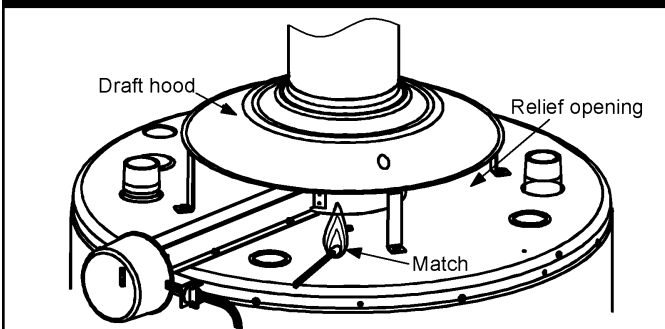
Important: If overheating occurs or the gas supply fails to shut off, close the manual gas supply valve and turn the gas control knob to the off position. Turn off the electrical supply to the unit and close the cold water supply valve. Do not operate the water heater again until it has been thoroughly checked by a qualified service technician.

Checking the Draft



After successfully lighting the water heater, allow the unit to operate for 15 minutes and check the drafthood relief opening for proper draft. Pass a match flame around the relief opening of the drafthood (See Figure 14). A steady flame drawn into the opening indicates proper draft. If the flame flutters or is blown out, combustion products are escaping from the relief opening. If this occurs, do not operate the water heater until proper adjustments or repairs are made to the vent pipe system.

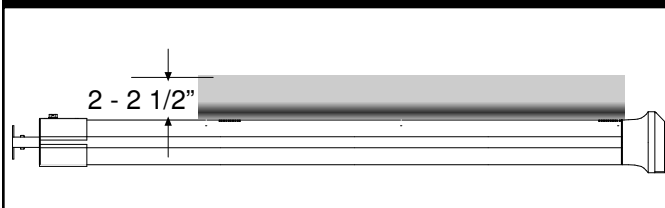
Figure 14: Vent Draft Test



Burner Flames

Inspect the burner flames through the viewport and compare them to the drawings in Figure 15. A properly operating burner should produce a soft blue flame and be about 2"(51mm) to 2 - 1/2"(64mm) in height. Blue tips with yellow inner cones are satisfactory. The tips of the flame may have a slight yellow tint. The flame should not be all yellow or have a sharp blue-orange color. Contaminated air may cause an orange colored flame. Contact a qualified service technician if the flame is not satisfactory.

Figure 15: Pilot/Burner Flame



Operational Conditions

Condensation

Moisture from the products of combustion condenses on the tank surface and the outside jacket of the water heater and forms drops of water which may fall onto the burner or other hot surfaces. This will produce a "sizzling" or "frying" noise. **This condensation is normal and should not be confused with a leaking tank.** Condensation may increase or decrease at different times of the year.

High efficient energy saver water heaters will produce larger amounts of condensation on initial start up or when a large amount of hot water is being used. **Do not confuse this with a "tank leak"**. Once the water reaches a temperature of 120°F (49°C) and the tank warms up (usually 1-2 hours), the condensation will stop.

Important: It is always recommended that a suitable drain pan be installed under the water heater to protect the area from water damage resulting from normal condensation production, a leaking tank or piping connections. Under no circumstances is the manufacturer to be held responsible for any water damage in connection with this water heater.

Water Heater Sounds

During the normal operation of the water heater sounds or noises may be heard. These noises are common and may result from the following:

1. Normal expansion and contraction of metal parts during periods of heat-up and cool-down.
2. Condensation causes sizzling and popping within the burner area and should be considered normal.
3. Sediment buildup in the tank bottom will create varying amounts of noise and may cause premature tank failure. Drain and flush the tank as directed under "Draining and Flushing".

Smoke/Odor

The water heater may give off a small amount of smoke and odor during the initial start-up of the unit. This is due to the burning off of oil from metal parts of a new unit and will disappear after a few minutes of operation.

Safety Shut-off

This water heater is designed to automatically shut-off in the event of the following:

1. The pilot flame is extinguished for any reason.
2. The water temperature exceeds 205°F (96°C).

MAINTENANCE OF YOUR WATER HEATER

Draining and Flushing

It is recommended that the tank be drained and flushed every 6 months to remove sediment which may buildup during operation. **Note:** Warranty is null and void in the event lime & scale deposits are allowed to exceed two inches in depth.

The water heater should be drained if being shut down during freezing temperatures. To drain the tank, perform the following steps:

1. Turn off the gas to the water heater at the manual gas shut-off valve and turn off electricity.
2. Close the cold water inlet valve.
3. Open a nearby hot water faucet.
4. Connect a hose to the drain valve and terminate it to an adequate drain.

Note: The drain hose should be rated for at least 200°F (49°C). If the drain hose does not have this rating, open the cold water inlet valve and a nearby hot faucet until the water is no longer hot.

5. Open the water heater drain valve and allow all the water to drain from the tank.
6. Remove the screws holding the cleanout plate, then remove the plate for access.
7. Remove any lime, sediment, or scale from the tank. Be careful not to damage the glass lining.
8. Flush the tank with water as needed to remove any remaining sediment.
9. Check gasket on cleanout plate, replace if necessary.
10. Replace the cleanout plate and screws, tighten sufficiently.
11. Close the drain valve, refill the tank, and restart the water heater as directed under "Operating Your Water Heater".

If the water heater is going to be shut down for an extended period, the drain valve should be left open.

Important: Condensation may occur when refilling the tank and should not be confused with a tank leak.

Routine Preventative Maintenance

At least annually, a visual inspection should be made of the venting and air supply system, piping systems, main burner, and pilot burner. Check the water heater for the following:

- Obstructions, damage, or deterioration in the venting system. Make sure the ventilation and combustion air supplies are not obstructed.
- Build-up of soot and carbon on the main burner and pilot burner. Check for a soft blue flame.
- Leaking or damaged water and gas piping.
- Presence of flammable or corrosive materials in the installation area.
- Presence of combustible materials near the water heater.
- Verify proper operation after servicing this water heater

Important: If you lack the necessary skills required to properly perform this visual inspection, you should not proceed, but get help from a qualified service technician.

Temperature and Pressure Relief Valve

WARNING



Explosion Hazard

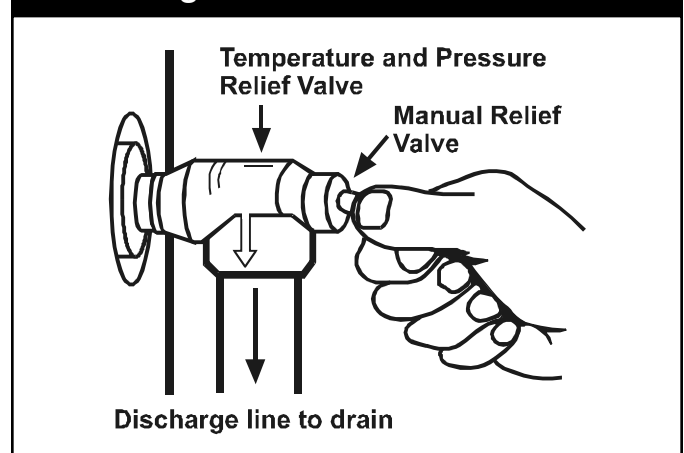
If the temperature and pressure relief valve is dripping or leaking, have a qualified service technician replace it.

- Do not plug valve.
- Do not remove valve.

Failure to follow these instructions can result in death or explosion.

Manually operate the temperature and pressure relief valve at least once a year to make sure it is working properly (See Figure 16). To prevent water damage, the valve must be properly connected to a discharge line which terminates at an adequate drain. Standing clear of the outlet (discharged water may be hot), slowly lift and release the lever handle on the temperature and pressure relief valve to allow the valve to operate freely and return to its closed position. If the valve fails to completely reset and continues to release water, immediately shut off the manual gas valve, electric power and the cold water inlet valve and call a qualified service technician.

Figure 16: T&P Valve Test

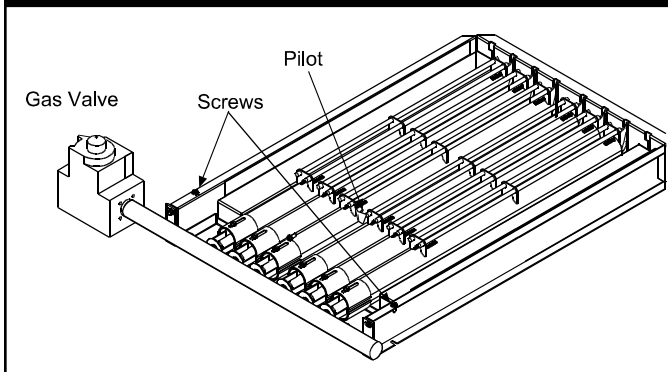


Pilot Burner and Main Burner Assembly Inspection

To access the pilot burner and main burner for inspection:

1. Turn off gas at main shutoff valve and turn off electrical power.
2. Disconnect the gas supply line from the gas valve.
3. Remove the 2 screws holding the Pilot & Main Burner Assembly in place. See Figure 17 for location of screws.

Figure 17: Pilot/Burner Assembly Removal



4. Carefully slide the assembly out of the water heater.
5. If needed, use a brush or vacuum to clean any soot or debris from the burners.
6. Check for correct alignment of burners before sliding assembly back into the water heater.
7. Carefully slide Pilot/Burner Assembly back into the water heater.
8. Replace and sufficiently tighten the two screws holding the Pilot/Burner Assembly in place.
9. Reconnect the gas supply line to the gas valve.
10. Turn on gas at main shutoff valve.
11. Check for gas leaks and proper operation on the unit after servicing.

Gas Valve Removal and Replacement

It is recommended that this maintenance be performed by a qualified service technician.

1. Turn the thermostat to its lowest setting.
2. Turn off gas at manual gas shut-off valve (see figure 10 for reference) and disconnect electrical power from water heater.
2. Unplug the 4 wires located on the gas valve. Label wire position for correct reattachment.
3. Disconnect pilot tube from the gas valve.
4. Disconnect the main gas line from the gas valve. Use care not to crack the gas valve housing.
5. Carefully unscrew the gas valve from the burner assembly.

Important: When removing gas control valve do not use a pipe wrench or vise to grip the body.

6. When replacing the gas valve, use an approved Teflon® or pipe joint compound on the pipe threads.
7. Screw the new gas valve onto the burner assembly.
8. Reconnect the pilot tube to the gas valve.
9. Reconnect the main gas line to the gas valve.
10. Turn the gas supply on and check for leaks. Use a chlorine-free soap and water solution (bubbles forming indicate a leak) or other approved method.
11. Reconnect the 4 wires to their proper location and restore electrical power to the unit.
11. Verify proper operation after servicing this water heater.
12. If additional information is required, contact the Product Service and Support Group at 1-800-456-9805.

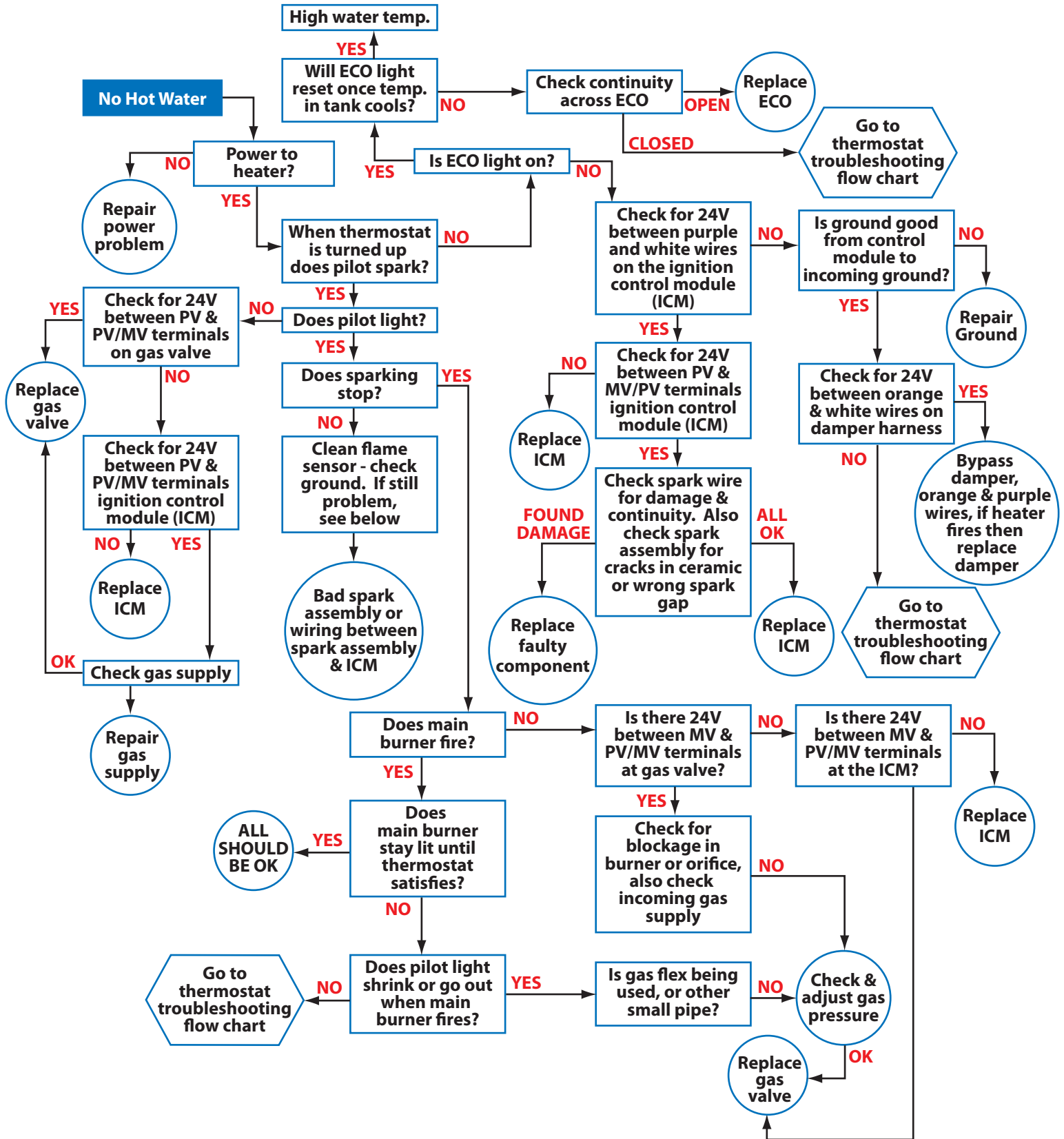
Anode Rod Inspection

Each water heater contains at least one anode rod, which will slowly deplete while protecting the glass-lined tank from corrosion and prolonging the life of the water heater. Certain water conditions will cause a reaction between the rods and the water. Once the anodes are depleted, the tank will start to corrode, eventually developing a leak. The most common complaint associated with the anode rod is a "rotten egg smell" produced from the presence of hydrogen sulfide gas dissolved in the water. Do not remove this rod permanently as it will void any warranties, stated or implied. A special anode is available for this complaint. This rod may reduce but not eliminate water odor problems. The water supply system may require special filtration equipment from a water conditioning company to successfully eliminate all water odor problems. Artificially softened water is exceedingly corrosive because the process substitutes sodium ions for magnesium and calcium ions. The use of a water softener may decrease the life of the water heater tank. The anode rods should be removed from the water heater tank every 3 years for inspection. If the rods are more than 50% depleted, the anode rods should be replaced.

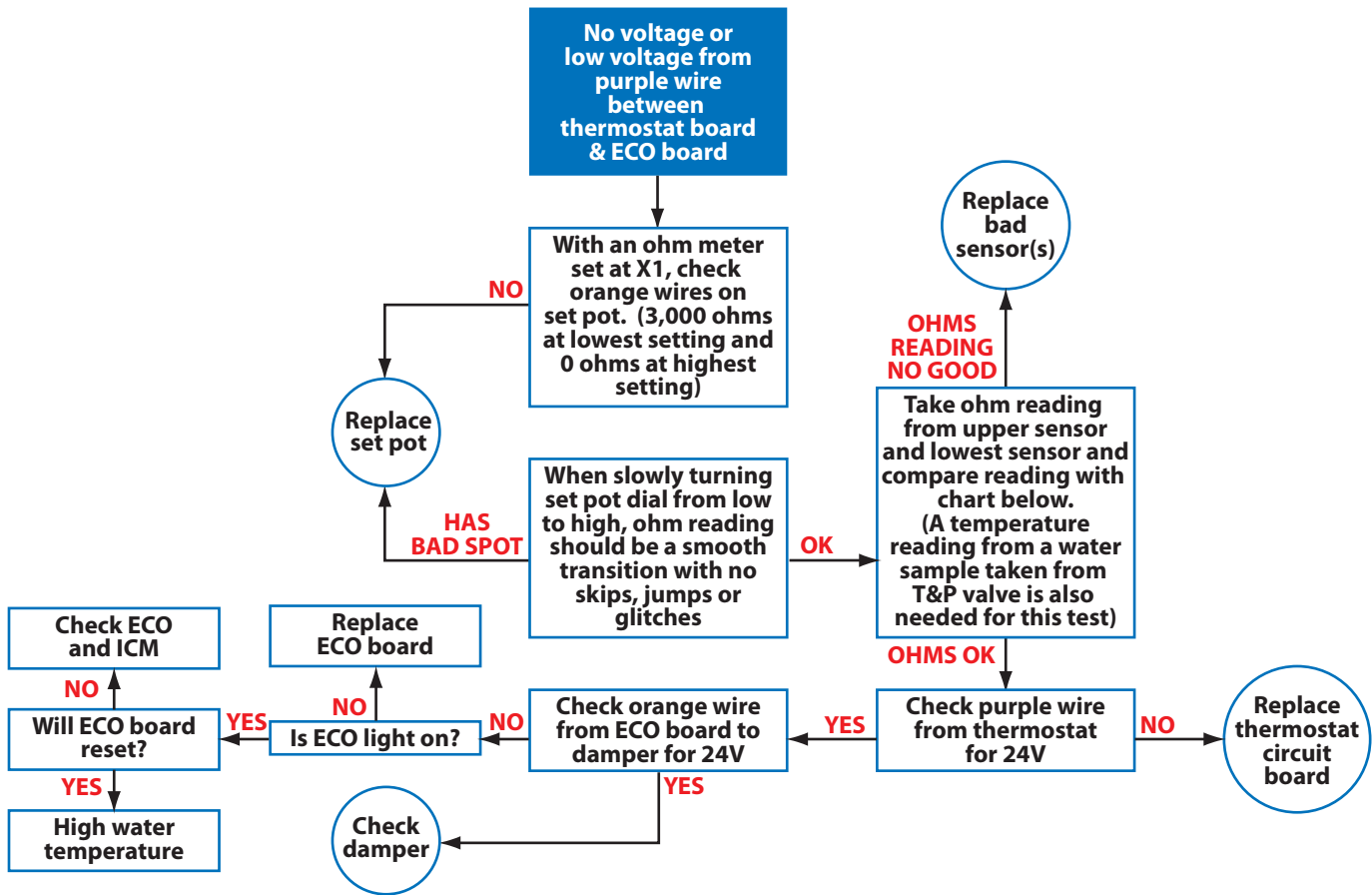
In replacing the anodes:

1. Turn off gas supply and electrical power to the water heater.
2. Shut off the water supply and open a nearby hot water faucet to depressurize the water tank.
3. Drain approximately 5 gallons (19 l) of water from tank (Refer to "Draining and Flushing" for proper procedures). Close drain valve.
4. Remove old anode rods.
5. Use Teflon® tape or approved pipe sealant on threads and install new anode rods.
6. Turn on water supply and open nearby hot water faucet to purge air from water system.
7. Restart the water heater as directed under "Operating Your Water Heater." See the "Repair Parts Illustration" for anode rod location.

DCG3 SERIES COMMERCIAL GAS DAMPERED WATER HEATERS



DCG3 SERIES THERMOSTAT TROUBLESHOOTING FLOW CHART

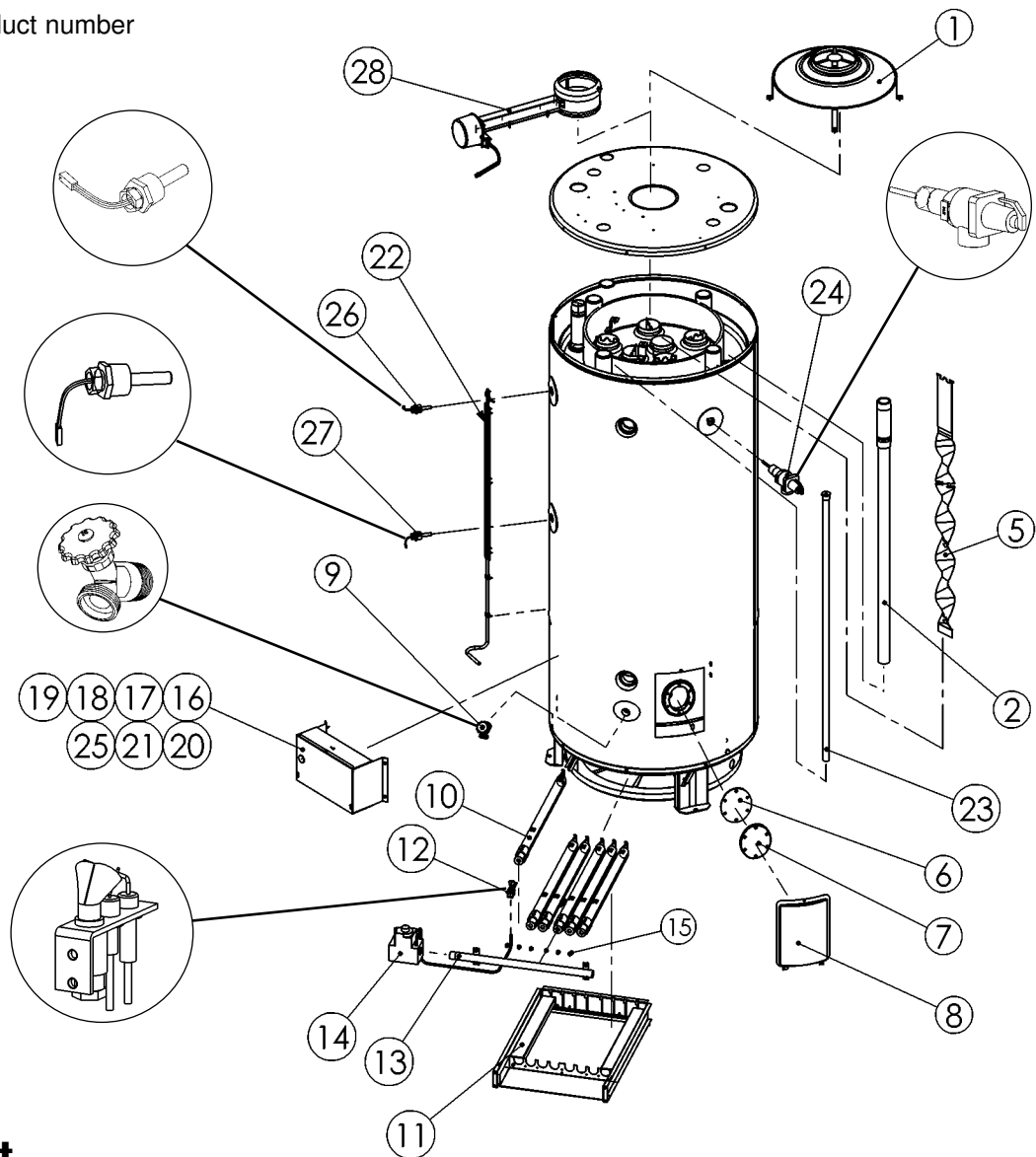


Sensor Resistance vs. Temperature										
Temp.	Resistance (K ohms)									
	0	1	2	3	4	5	6	7	8	9
0°C	32648	31026	29495	28049	26682	25389	24166	23010	21915	20879
10°C	19898	18968	18088	17253	16461	15710	14998	14322	13680	13071
20°C	12492	11942	11419	10922	10450	10000	9572	9165	8778	8409
30°C	8057	7722	7403	7099	6808	6532	6268	6016	5775	5546
40°C	5327	5117	4917	4726	4543	4368	4201	4042	3889	3742
50°C	3602	3468	3340	3217	3099	2986	2878	2774	2675	2579
60°C	2488	2400	2316	2235	2157	2083	2011	1942	1876	1813
70°C	1752	1693	1637	1582	1530	1480	1432	1385	1340	1297
80°C	1256	1216	1177	1140	1105	1070	1037	1005	974	944
90°C	916	888	861	835	810	786	763	741	719	698
40°F	26109	25400	24712	24045	23399	22771	22163	21573	21000	20445
50°F	19906	19383	18876	18383	17905	17440	16990	16553	16128	15715
60°F	14884	14422	13976	13545	13128	12724	12332	11951	11581	11221
70°F	11884	11592	11308	11032	10763	10502	10248	10000	9760	9526
80°F	8733	8516	8300	8093	7896	7708	7528	7355	7188	7026
90°F	7333	7165	7000	6839	6683	6531	6383	6238	6098	5961
100°F	5827	5697	5570	5446	5326	5208	5094	4982	4873	4767
110°F	4758	4649	4542	4437	4334	4232	4132	4034	3938	3844
120°F	3758	3679	3602	3527	3453	3382	3312	3244	3177	3112
130°F	3088	3029	2972	2917	2864	2812	2761	2711	2662	2614
140°F	2488	2439	2391	2344	2298	2253	2209	2166	2124	2083
150°F	2088	2049	2011	1974	1938	1902	1867	1832	1798	1764
160°F	1688	1656	1625	1595	1566	1537	1509	1481	1454	1427
170°F	1388	1362	1337	1312	1288	1264	1240	1216	1193	1170
180°F	1170	1150	1129	1110	1090	1071	1053	1035	1017	999
190°F	982	965	949	933	917	901	886	871	857	842
200°F	828	814	801	788	775	762	749	737	725	713

REPAIR PARTS ILLUSTRATION

When ordering repair parts always give the following information:

1. Model, serial, and product number
2. Type of gas
3. Item number
4. Parts description



Repair Parts List

No.	Part Name and Description	No.	Part Name and Description
1	Drafthood	15	Main Burner Orifice(s)
2	Diptube (Top)	16	Control Box Cover
3	Diptube (Front) (Optional not pictured)	17	Transformer
4	Diptube (Back) (Optional not pictured)	18	Ignition Control Module
5	Flue Baffles	19	Thermostat board
6	Clean Out Gasket	20	ECO Reset Board
7	Clean Out Cover	21	Control Box
8	Clean Out Cover Jacket	22	Wiring Harness
9	Drain Valve	23	Anode Rod(s)
10	Main Burner Tube(s)	24	T&P Valve
11	Burner Tray	25	Temp. Control Potentiometer
12	Pilot Burner Assembly	26	Upper Temperature Sensor/ECO
13	Main Burner Manifold	27	Lower Temperature Sensor
14	Gas Valve	28	Flue Damper